Nuclear Testing Moves Ahead at Yucca Flat Amid Questions Raised by Freeze Movement

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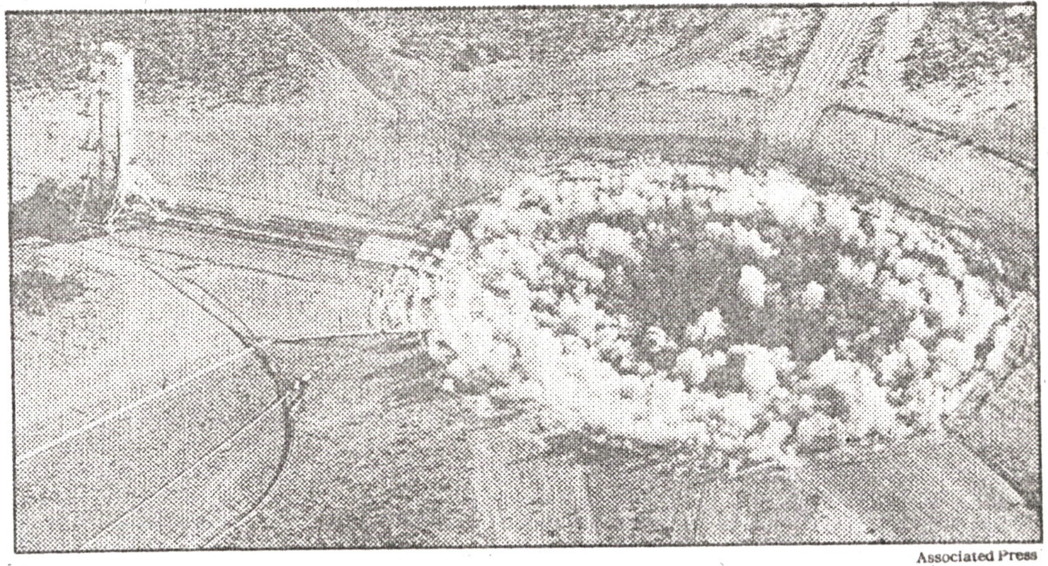
YUCCA FLAT, Nev. — Out among the mesquite, yucca and Joshua trees, here and there on the vast arid landscape, drilling rigs go about their business of penetrating hundreds and thousands of feet into the desert basin. They are opening more holes into which more nuclear weapons will be deposited and then exploded in the continuing effort to understand and advance this awesome technology.

In a tunnel far into the side of Rainier Mesa, to the west, another test is being prepared to determine what effects an enemy nuclear blast in space might have on American missiles in the vicinity. This new test, code-named Huron Landing, is scheduled for later this year.

At least three new underground nuclear explosions by the United States are in the offing, according to officials of the Department of Energy's Nevada Test Site here. Fifteen announced tests and several unannounced ones are to be conducted during the year. This has been the rate of testing for the last several years.

The growing movement to freeze the development and deployment of nuclear weapons, or to negotiate some new curbs on the arms race, has in no way slowed the pace of activity here, officials said last week, though it raises questions as to what the future has in store. The officials expressed doubt that a nuclear freeze would necessarily put an end to testing, which has usually gone steadily and quietly forward with seemingly little regard to shifts in political attitudes toward nuclear arms.



Associated Press

Aerial view of beginning of underground nuclear test explosion at Los Alamos, N.M., in 1969.

The tests are not as spectacular as they used to be. No more mushroom clouds erupt into the sky. In 1963, the Limited Test Ban Treaty prohibited nuclear explosions in the atmosphere or in outer space, and so everything went underground. Little if any testing capability was lost, the Department of Energy said, but the partial ban had the effect of making nuclear testing seem to be a thing of the past.

Even though it has been 37 years since the first atomic bomb test, near Alamogordo, N.M., and the subsequent bombing of Hiroshima and Nagasaki in 1945, testing has continued in order

Continued on Page 23

APRIL 7, 1982

Nuclear Testing Moves Ahead at Yucca Flat Amid Questions

Continued From Page 21

to evaluate modifications of weapons for more advanced missiles and bombers and to check out safeguards developed to reduce the risk of accident. Since the ban on atmospheric testing was signed with the Soviet Union, about 370 underground tests have been conducted here, an average of 40 a year during the late 1960's. The United States has announced more than 700 tests in all, many of them in the early days out in the Pacific, at Bikini and Enewetak atolls, but most of them here at Yucca Flat or Frenchman Flat, Pahute Mesa or Rainier Mesa.

Each time a missile is modified or a new missile is developed, nuclear warheads also have to be modified or redesigned, said Mahlon E. Gates, Nevada operations manager for the Department of Energy. Each missile, artillery shell or aerial bomb has its own size, weight and shape restrictions. Each weapon for these delivery systems has its prescribed radiation yield. And so, he said, new warheads must be tested before they are installed in the new delivery systems.

Thus, some of the recent underground explosions have been demonstrations of the triggering mechanisms, different configurations and capabilities of the nuclear explosives for the MX intercontinental missile and the cruise missiles, both now under development as next-generation weapons systems. The cruise missile is being designed to be launched from the air, from the ground and from under water. The neutron bomb has also been tested here.

David F. Miller, director of public affairs for the test site, said: "It's more cost-efficient to design new explosives for new delivery systems than to try to take existing warheads and modify them for use in a new system. Then you have to test them to make sure the new design, size and weight works the way you want it to. Any given weapon system may take as many as 10 to 15 detonation tests."

From time to time, Mr. Miller said, existing weapons are taken "off the shelf" and tested to see if that particular vintage remains reliable and potent.

Other tests concentrate on the development of safety and safeguard technology. All weapons, Mr. Gates said, are designed to assure that they cannot be accidentally detonated by impact, fire, stray electrical signals or tampering by unauthorized persons.

The Los Alamos National Laboratory, for example, developed an extremely insensitive high explosive for use in nuclear weapons. In the early weapons, ordinary TNT was detonated to produce in the uranium or plutonium fuel the critical mass leading to the chain reaction and thus the deadly energy radiated by the bomb. The new explosive is said to be so insensitive that it will not detonate even under machine-gun fire.

A third type of test investigates the effects of nuclear explosions. Walking deep into a tunnel, Capt. Leslie Ratliff of the Army explained that every year or two the Department of Defense explodes a nuclear device inside Rainier Mesa and channels the radiation through huge pipes into a vacuum chamber where the space environment is roughly duplicated.

In one test in 1972, code-named Diamond Scull, full-scale missile was placed inside the vacuum chamber to see what effect intensive radiation from a nuclear blast would have on an intercontinental missile passing through the fringes of outer space. Subsequent tests and the upcoming Huron Landing experiment subject only components to such radiation. The purpose is to evaluate the potential damage to new metal alloys, communications equipment, electronic components and other systems in American missiles.

The exact nature and timetable of test explosions is secret. But to drive across the flats — the test site spreads over 1,350 square miles north of Las Vegas — is to see drilling rigs in operation.

"We stockpile holes in the ground," Mr. Miller said. Over one of the holes a weapon is being fitted on a rack inside a green protective tower, called a bogie, before the weapon is to be lowered into place for firing.

Department of Energy contractors, stretching oil-drilling technology, have developed drill bits that can bore holes up to 12 feet in diameter and thousands of feet deep at one pass — down to at least 5,000 feet.

It takes months to prepare for a firing. After the hole is drilled, scientists and engineers from the laboratory that built the weapon — Los Alamos, Sandia, , Lawrence Berkeley or Lawrence Livermore Laboratories — arrive to assemble the device and implant it. Sensors are attached to obtain data. Radiation monitors are established over a wide perimeter.

On the appointed morning, the test coordinator sits at Control Point, a windowless concrete building on the saddle of a ridge overlooking Yucca Flat. At a table with him, watching monitors of weather reports and other data, are a meteorologist, medical and scientific advisers and a representative of the Environmental Protection Agency.

Weather balloons are lofted shortly before the firing to see which way the winds blow; though radiation leaks are said to be rare in underground tests, the winds are watched closely for any threat that such leaks might carry beyond the test site.

A computer-controlled countdown begins about 5 to 15 minutes before detonation, the final signal to detonate being sent to the weapon by microwave. Remote television cameras onthe ground and in nearby helicopters keep watch over ground zero.

When the buried weapon first explodes, dust rises from the surface and then the ground heaves upward, settling back quickly. Below, temperatures from the bomb blast reach 100 million degrees Fahrenheit and the pressure 100 million times normal. Much of the dust and rock vaporize from the heat. Pressure pushes surrounding soil outward creating a vast subterranean cavity. Then, as the pressures subside, so does the cavity.

The collapse of the cavity, which occurs within seconds or minutes, is visible on the surface, which caves in, leaving a yawning crater. In some recent tests, a 13-kiloton bomb left a crater 472 feet wide and 89 feet deep; a 140-kiloton bomb produced a crater 750 feet by 100 feet. An aerial view of Yucca Flat looks somewhat like the pockmarked surface of the moon.

All weapons tests are restricted to a ceiling of 150 kilotons, in compliance with the threshold treaty negotiated by former President Nixon with the Soviet Union. Although the treaty has yet to be ratified by the Senate, the United States adheres to its conditions. The bombs dropped on Japan had a power equivalent to 20 kilotons of TNT.

About 4,000 people work at the Nevada test site, most of them employees of private companies under contract to the Department of Energy. Another 2,000 work at the Las Vegas office. The annual budget for the operation runs $650 million.

Though weapons testing is the primary concern, projects begun in recent years deal with the problems of how to store nuclear wastes, the still highly radioactive fuels from nuclear power plants and from the byproducts of weapons production. Engineers are monitoring wastes buried in vaults in the desert and deep in a granite mountainside.

Some people would like to see the Nevada Test Site turn its attention totally away from weapons. The student government at the University of Nevada at Las Vegas passed a resolution last week demanding an end to the nuclear testing. And each morning, workers driving through the main gate pass a handful of demonstrators, many of them Roman Catholic clergy who have come out to say prayers for peace.

Space Shuttle Is Poised to Go Home

WHITE SANDS, N.M., April 5 (UPI) — Officials at this Army missile range today said the space shuttle Columbia will depart at 9 A.M. Tuesday atop a Boeing 747 jet on the first leg of its return trip to Kennedy Space Center in Florida.

"That's official," said White Sands project engineer Chuck Stephens.

Mr. Stephens said the takeoff of the shuttle — which will ride piggy-back on the 747 — could be delayed, however, if there is bad weather en route to the first stop, Barksdale Air Force Base near Shreveport, La.

"If the weather is bad on the route, they'll hold here," he said.

Technicians at Northrup Strip, located about 80 miles north of El Paso, Texas, were wary of spring winds as they began the difficult procedure of using two cranes to "mate" the 122-foot-long orbiter to the 747 today.